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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,646	11/13/2001	Xiaofeng Han	980.1076US01	4858
22865	7590	11/12/2003	EXAMINER	
ALTERA LAW GROUP, LLC 6500 CITY WEST PARKWAY SUITE 100 MINNEAPOLIS, MN 55344-7704			LEE, HWA S	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 11/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/010,646	HAN ET AL.	
	Examiner	Art Unit	
	Andrew H. Lee	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 17-34 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____.  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____. | 6) <input type="checkbox"/> Other: _____.                                   |

## DETAILED ACTION

### *Claim Objections*

1. **Claim 19** is objected to because of the following informalities: Claim 19 recites “the ordinary and extraordinary beams” and it appears that it should read “the first and second polarized beams” and will be examined as such. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims 1-11, 15, and 17-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US 6,459,487).

Chen et al (Chen hereinafter) shows a system and method for fabricating components of precise optical path length comprising:

a first birefringent element (34) oriented to split the polarized input light beam into a first polarized beam and a second polarized beam having a polarization direction different to a polarization direction of the first beam;

a second birefringent element (40) oriented to combine the first and second polarized beams into an output beam; and

a polarization sensitive detection unit (42, 44, 18, and 20) disposed to detect a selected polarization of the output beam.

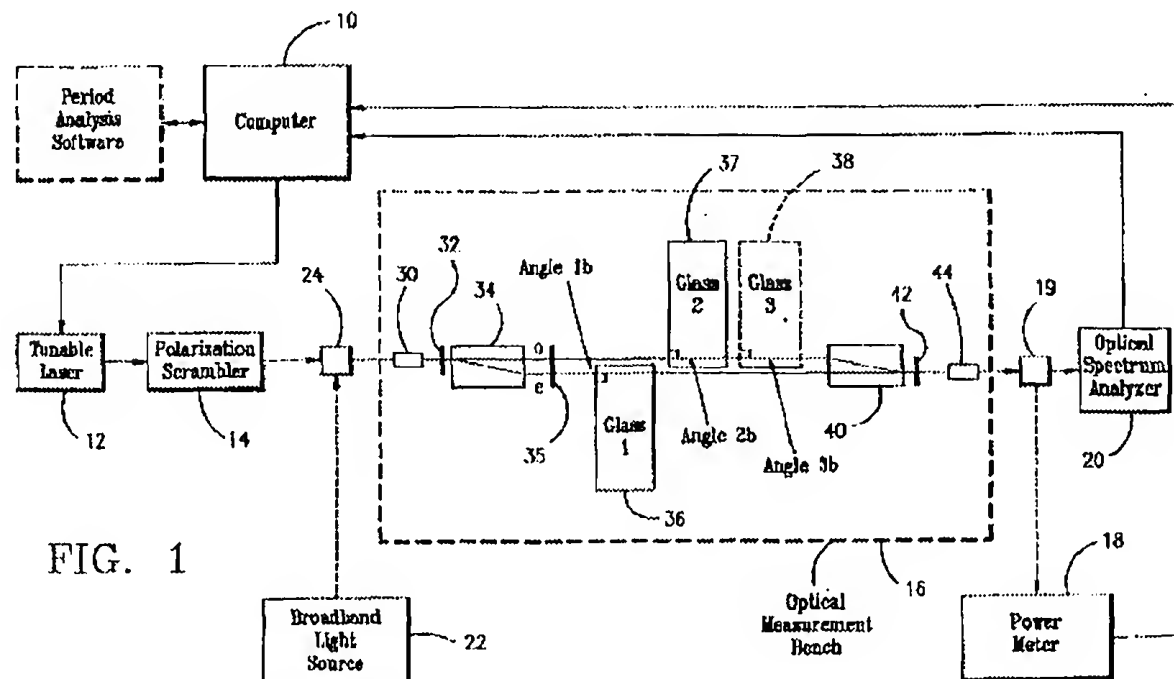


FIG. 1

Chen does not expressly say that the first and second polarized beams have a polarization direction that is orthogonal to each other.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to have the polarization direction of the first beam orthogonal to the polarization direction of the second beam. Chen teaches that one beam is e polarized and the other beam is o polarized and that a  $\frac{1}{2}$  waveplate is used to rotate the polarization of one of the beams by 90 degrees in order

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combine the beams thus suggesting to one of ordinary skill in the art to have the e polarization orthogonal to the o polarization. Please see column 6, lines 6-13.

As for **claim 2**, Chen shows a light source (12 and 22) disposed to transmit the polarized input light beam to the first birefringent element.

As for **claim 3**, Chen shows that the light source (12) is a laser thus inherently producing a polarized beam and furthermore, Chen uses a polarization descrambler (30) to scramble the polarized beam and then uses a polarizer (32) to polarize the depolarized beam, thus suggesting to one of ordinary skill in the art that the descrambling the polarizing cleans the polarization of the beam.

As for **claim 4**, Chen shows the light source (22) includes a light generator that generates an unpolarized output, the unpolarized output passing through a polarizer (32) to produce the polarized input light beam.

As for **claim 5**, Chen shows a broadband light source (22).

As for **claim 6**, Chen shows a laser (12).

As for **claim 7**, Chen shows a tunable laser (12).

As for **claim 8**, Chen shows a controller (computer 10) coupled to control operation of the at least one of the light source and the detector unit.

As for **claim 9**, Chen shows that the computer has an analyzer unit coupled to the detector unit to record an output from the detector unit (column 6, lines 37-41 and column 7, lines 6-18).

As for **claim 10**, Chen shows an interface unit connected to the controller and couplable to a computer (column 5, lines 48+).

As for **claim 11**, Chen shows a polarizer (42) to select the selected polarization of the output beam from the second birefringent element.

As for **claim 15**, Chen shows the first birefringent element is oriented to receive the polarized input light beam along a z-direction, a y-direction is defined perpendicular to the z-direction and at 45 degrees to the polarization direction of the polarized input light, an x-direction is defined orthogonal to both the y-direction and the z-direction, and the first birefringent element has an optical axis lying at a selected angle,  $\Theta$ , relative to the z-direction in the y-z plane defined by the y-direction and the z-direction (column 6, lines 6+).

As for **claim 17**, Chen shows the second birefringent element has an optical axis lying at the selected angle,  $\Theta$ , relative to the z-direction in the y-z plane defined by the y-direction and the z-direction (column 6, lines 6+ and please see figure 1).

As for **claim 18**, Chen shows the first and second polarized beams are spatially separated by the first birefringent element so that the first polarized beam does not overlap the second polarized beam between the first and second birefringent elements (please see figure 1).

As for **claim 19**, Chen shows the first and second birefringent elements are separated along a direction parallel to a propagation direction of the first and second beams so as to leave a gap between the first and second birefringent elements (please see figure 1).

4. **Claims 12 -14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen as applied to claim 1 above, and further in view of Brooks et al (US 5,675,411).

Chen shows all the elements as claimed in claim 1 and in particulars shows a spectrum analyzer but does not expressly show that the spectrometer includes a photodetector. Chen also does not show that the spectrometer disperses the selected polarization of the output beam before

reaching the photodetector, but rather Chen shows a polarizer separate from the spectrometer to disperse the selected polarization of the output beam before reaching the photodetector.

Brooks et al (Brooks hereinafter) show a spectrometer comprising a CCD photodetector (38) to convert the desired optical signals to electrical signals for obtaining measurement values of the optical signal.

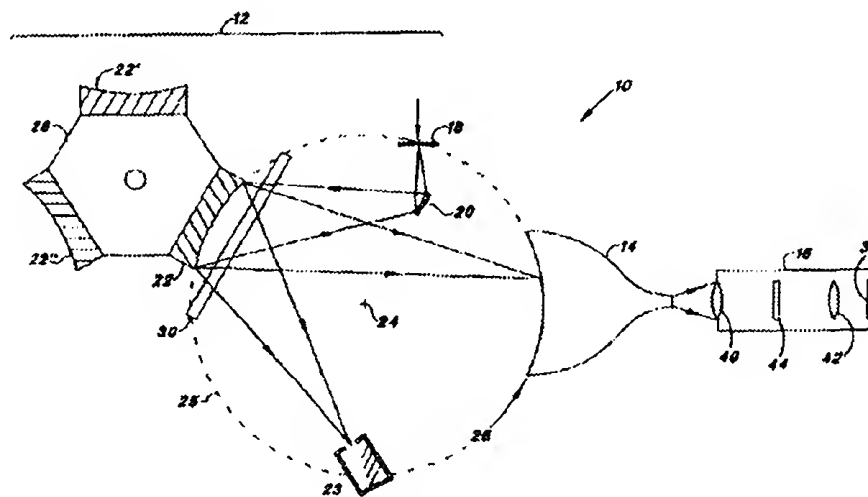


FIG. 1

As for the location of the polarizer, at the time of the invention, one of ordinary skill in the art would have housed the polarizer which is immediately upstream of the spectrometer so that the polarizer is inside of the housing of the spectrometer in order to have fewer parts to optically realign and furthermore, rearranging parts of an invention involves only routine skill in the art.

As for the use of a photodetector in the spectrometer, at the time of the invention, one of ordinary skill in the art would have used the spectrometer of Brooks having a CCD photodetector which is a multiple channel photodetector, for converting the desired wavelength portions of the combined optical signals into electrical signals in order for the signals to be recognized by the computer (control unit) and thus be able to obtain measurement values.

5. **Claims 20 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen

Chen shows a system and method for fabricating components of precise optical path length comprising:

polarization beam splitting means (34) for splitting an incoming polarized light beam into first and second light beams;

polarization beam combining means (40) for combining the first and second light beams of orthogonal polarization into an output beam;

polarization sensitive detection means (42, 44, 19, 20, 18) for detecting polarization of the output beam; and

a wavelength selection means (12) for selecting a wavelength of light detected by the polarization sensitive detection means

Chen does not expressly say that the first and second polarized beams have a polarization direction that is orthogonal to each other.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to have the polarization direction of the first beam orthogonal to the polarization direction of the second beam. Chen teaches that one beam is e polarized and the other beam is o polarized and that a  $\frac{1}{2}$  waveplate is used to rotate one the polarization of one of the beams by 90 degrees in order combine the beams thus suggesting to one of ordinary skill in the art to have the e polarization orthogonal to the o polarization.

As for **claim 21**, Chen shows polarized light emitting means (12, 22, 14, 32) for emitting a polarized light beam as an input to the polarization splitting means.



6. **Claims 22-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen.

Chen shows a system and method for fabricating components of precise optical path length comprising:

a birefringent beam splitter having an input path and first and second output paths;

a birefringent beam combiner having first and second input paths and an output path, the first and second input paths of the birefringent beam combiner aligned respectively with the first and second output paths of the birefringent beam splitter; and

a polarization sensitive arrangement (42, 18, 20) disposed on the output path of the birefringent beam combiner.

Chen does not expressly show that the elements of the polarization sensitive arrangement are integrated as a single unit however it would have been obvious to one of ordinary skill in the art to combine the separate elements into a single unit or packaging in order to have fewer optical elements to align.

As for **claim 23**, Chen shows a light source (12 and 22) disposed to transmit the polarized input light beam to the first birefringent element.

As for **claim 24**, Chen shows that the light source (12) is a laser thus inherently producing a polarized beam and furthermore, Chen uses a polarization descrambler to scramble the polarized beam and then uses a polarizer to polarize the depolarized beam, thus cleaning the polarization of the beam.

As for **claim 25**, Chen shows the light source (22) includes a light generator that generates an unpolarized output, the unpolarized output passing through a polarizer (32) to produce the polarized input light beam.

As for **claim 26**, Chen shows a tunable laser (12) and a controller (computer 10) coupled to control operation of the at least one of the light source and the detector unit.

7. **Claims 27-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen as applied to claim 22 above, and further in view of Brooks.

For **claims 27 and 28**, Chen shows all the elements as claimed in claim 22 but does not expressly show that the polarization sensitive detector unit includes a photodetector. Chen shows an optical spectrum analyzer but does not show the components that make up the optical spectrum analyzer .

Brooks shows an optical spectrum analyzer comprising a photodetector (38) and a movable light dispersing unit (28) disposed before the photodetector.

At the time of the invention, one of ordinary skill in the art would have used a spectrometer having a photodetector in order to obtain quality measurement over a broad range since Brooks teaches that his spectrometer has a broad range while maintaining high resolution.

As for **claims 29 and 30**, Brooks does not expressly show a controller coupled to the movable dispersing element. However, Brooks teaches that the dispersive element can be rotated as desire therefore, it would have been obvious to one of ordinary skill in the art to automate the rotating with a controller and a computer .

As for **claim 31**, Brooks shows a CCD detector (38) which is a multiple channel photodetector disposed to detect multiple wavelengths of light dispersed by the light dispersing unit.

As for **claim 32**, Brooks shows a data analysis unit (10) coupled to the polarization sensitive detector to analyze an output signal from the polarization sensitive detector.

As for **claim 33**, Brooks shows a computer (10), but does not expressly show a display unit. At the time of the invention, one of ordinary skill in the art would have used a computer with a display unit in order for the operator to observe the measurement data. Official Notice is taken that display units (monitors) are old and well known in the art. See *In Re Malcolm* 1942 C.D.589: 543 O.G.440.

As for **claim 34**, Brooks shows that data analysis is performed by the computer.

*Allowable Subject Matter*

8. **Claim 16** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to show or to suggest a birefringent interferometer comprising of the combination of all the elements as presently claimed wherein the second birefringent element has an optical axis lying at the negative of the selected angle,  $-\Theta$ , relative to the z-direction in the y-z plane defined by the y-direction and the z-direction.

Papers related to this application may be submitted to Technology Center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the PTO Fax Center located in CP4-4C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Center numbers are 703-872-9306 for regular communications and for After Final communications.

If the Applicant wishes to send a Fax dealing with either a Proposed Amendment or for discussion for a phone interview then the fax should:

a) Contain either the statement "DRAFT" or "PROPOSED AMENDMENT" on the Fax Cover Sheet; and

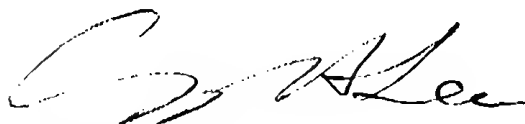
b) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Hwa Lee whose telephone number is (703) 305-0538.

The examiner can normally be reached on M-Th. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 703-308-4881.



Andrew Lee  
Patent Examiner  
Art Unit 2877

November 2, 2003/ahl